

is hereditary and congenital, cretinism is endemic.—M. Gustave Le Bon, in defending the accuracy of his determinations of the comparative weight of the brain of boys and girls against the charges advanced by M. Budin and Manouvrier, explains his methods of determination, which, in his opinion, confirm the conclusions contained in his earliest memoir on the subject: viz. that (1) while male and female children differ very little in weight at their birth, when, if the weight of boys be taken at 100, that of girls will be 94.28, the difference between the sexes in adult life may be at least three times greater; (2) that at the same age, with equal stature and weight, the female brain will be found notably inferior in weight to that of the man.—On the cranial dimensions of the savage Stiengs, or Moïs, of Cochinchina, by Dr. P. Neis, who finds that this people exhibits the low mean cranial capacity of 1400, with a cephalic index of only about 75.—M. Capitan records the results of his experiments on the methods of trepanning employed in prehistoric times. He has experimented both on the living and dead subject, using a flint instrument, with which he reproduced perforations similar to those observed in prehistoric crania. This was effected by boring and incision, as well as by scraping, and in both cases the animals operated on recovered rapidly and completely from the operation, although Broca had maintained that the removal of any part of the cranial surface could not possibly have been effected on the living subject by such instruments as were used by primitive man.—Dr. Collignon describes the nature of the human remains found at Cumèries, Meuse, belonging to the Neolithic age, among which are seven well preserved skulls, and various long bones, including two platycnemid tibiae.—Dr. Heurot's report of the ossuary of the polished stone period, discovered in 1881 at Liry, in the Ardennes, was laid before the Society by M. Mortillet, who drew attention to the extraordinary projection of the lower jaw observable in one of the crania, which in this particular seems to foreshadow the present and future evolutionary change, rather than to accord with the ordinary type of the receding anthropoid chin of the prehistoric ages. In the course of the discussion arising out of Dr. Heurot's communication, M. Legnay described similar burial places examined by himself at Le Grand Compant, near Luzarches, and at Vaureal, Pontoise, where, as at Liry, a passage composed of upright stones, and covered in with wood, gave admittance to the true sepulchral chambers.—M. Topinard reports on his examination of *Le Questionnaire de Sociologie et d'Ethnographie*, issued by the commission appointed by the Society for its elaboration; and while he approves generally of the plan followed, which is that suggested by M. Letourneau, he has drawn attention to numerous points omitted by the latter, who, by his mode of defending the proceedings of the Society, and attacking M. Dally, gave an aggressively personal character to the discussion, very unusual in meetings of the Society. Owing to want of unanimity among the members, the method to be followed for the French system of instructions for travellers still remains undecided.—The Galibis of Cayenne, who have long been established in the Jardin d'Acclimatation of Paris have been made the subject of an exhaustive study by M. Manouvrier, whose detailed communications of the numerous observations and determinations in regard to the sociology, language, and ethnology of these tribes led to a somewhat lengthy discussion on the *rationale* and early extension of the practice of the *couvade*, which has been observed among the Galibis of French Guiana, as well as among the Basques, and appears to have prevailed under various modifications among several ancient peoples.

Rendiconti of the Reale Istituto Lombardo, May 31.—A comparative study of the fauna of the various Pliocene deposits in Lombardy, by Dr. C. F. Parona. As many as 275 species were examined, 248 in the Pliocene of the Northern Apennines, and 187 in the Upper Miocene, of which 117 still survive in the neighbouring seas.—On Paff's method of integration of partial differential equations of the first order, by Prof. E. Beltrami.—A contribution to the history of the adulteration of food from the earliest times, by C. L. Gabba.—On the mortality of infants during the first and second years of their lives in the various provinces of Italy, by Prof. G. Sormani. For the decade ending 1880 the average rate of mortality in the first year throughout Italy was 214.9 per 1000, and in the second 114.6 per 1000. Compared with the rest of Europe, these figures show that Italy occupies the lowest position in the scale, the death-rate being in excess even of Croatia and Slavonia (107.4) and of Russia (102.7). In the general comparative table, Ireland stands first (34.5), England occupying a medium position with an average of 59.1 per 1000.—The career of David Lazzeretti, founder of

the new sect of Lazzerettists, studied in the light of documents recently discovered, by G. Barzellotti.—The telephone in its legal aspect (continued), by C. Norsa.

Bulletin de la Société d'Encouragement pour l'Industrie Nationale, June, 1883.—Report on M. Lavanchy-Clarke's workshops for the blind, by M. Legentil.—Report on M. Lattry's tinted papers, by M. Ern. Dumas.—Colouring elements of madder and their metamorphoses, by M. A. Rosenstiehl.—On the saline tracts in the south-east of France, by M. P. de Gasparin.—On sewing-machines and sewing-machine industries of all sorts, as shown at the Paris Universal Exhibition of 1878, by M. Emile Bariquand.

THE number for June 15 of the *Archives des Sciences Physiques et Naturelles* contains researches on the absorption of ultra-violet rays by different substances (seven plates), by M. J. L. Soret (fourth memoir).—A new contribution concerning the family of Tintinodæ, by Dr. Herman Fol (one plate).—On the magnifying power and strength of dioptric arrangements, by Dr. Adrien Guébbard.—Meteorological observations at the Geneva Observatory for the month of May.

SOCIETIES AND ACADEMIES LONDON

Geological Society, June 6.—Mr. J. W. Hulke, F.R.S., president, in the chair.—George Paul was elected a Fellow of the Society.—The following communications were read:—The estuaries of the Severn and its tributaries, an inquiry into the nature and origin of their tidal sediment and alluvial flats, by Prof. W. J. Sollas, M.A., F.R.S.E., F.G.S.—Notes on a collection of fossils and rock-specimens from West Australia, north of the Gascoyne River, by W. H. Hudleston, M.A., F.G.S.—Notes on the geology of the Troad, by J. S. Diller. Communicated by W. Topley, F.G.S. This paper gave a brief account of the results obtained by the author whilst attached to the United States Assos Expedition. Together with a geological map (scale 1 : 100,000) this was sent to Mr. Topley for the service of the new geological map of Europe (and its borders), which is now being prepared by a Committee of the International Geological Congress. The country described is that lying south and west of the River Menderé (Scamander). The sedimentary rocks may be divided into three great groups:—1. An old, possibly Archæan, highly crystalline series, forming the mountainous lands of the Ida range (5750 feet), but also appearing in smaller detached areas to the west and north-west. Probably these have existed as islands from early times, and around these the later rocks have accumulated. Mount Ida itself is almost a dome, the lowest rocks (talcschists) occupying the summit. On the northern slopes there is true gneiss. No igneous rocks enter into the structure of this mountain. At different horizons there are bands of coarsely crystalline limestone, and as far as can be seen this series is conformable throughout. 2. Resting on these old rocks and in part made up of their remains is a series of partially crystalline rocks, chiefly limestone. It is probable that this series is in large part of Cretaceous age; but it contains rocks which are older, possibly Palæozoic. Eocene fossils have lately been discovered by Mr. Frank Calvert, which also may have come from this series. The rocks in the south of the Troad, hitherto supposed to be Lower Tertiary, are now known to be of later date. Sharply marked off from these older rocks are the Upper Tertiaries; these are of two ages, occurring in two distinct areas. 3. The *Upper Miocene*, which fringes the western shores of the Troad, and forms a broader band at the north-west corner in the lower course of the Menderé. Hissarlik is built on this. These beds are marine, and belong to the *Sarmatian Stage*. The Troad is the most south-westerly point at which the *Mastra-kalk* is yet known. 4. Freshwater beds, which occur in force in the interior of the country, between the Menderé and the south coast, and in patches near the coast. These are *Upper Miocene* or *Lowest Pliocene*. Later than these are the *Pliocene beds* of the great plain of Edsomet. The igneous rocks are of various ages, but most are of Tertiary date. The oldest is a *granite* which intrudes through and alters the oldest (? Archæan) crystalline rocks. This is invaded by dykes of *Quartz-porphyr*. *Quartz-diorite* invades and alters the group of partially crystalline rocks. The oldest rocks in the newer series are the *Andesites* and *Liparites*. These, in part, are older than the Sarmatian stage, as the conglomerate at its base contains fragments of these rocks. But they are also in part of later date. Where they can be studied together the Liparite is the later of the two, as it flows through and carries up fragments

of the Andesite. The Andesite (unlike the Liparite) seems to have reached the surface, in some cases, through volcanic vents. *Basalts* and *Nepheline-basalts* are of late Tertiary date; possibly they are the latest volcanic rocks of the district, but their relation to the other eruptive rocks of the Troad cannot be definitely determined. The volcanic rocks in the isolated area between Alimadja and Lyalar are interesting because their relative ages are here well seen. The earliest was melaphyre; this was followed by mica-andesite, hornblende-andesite, augite-andesite, basalt, and late (if not last) by liparite. Mr. Topley, who in the absence of the author read the paper, explained the objects of the Assos Expedition and the geological results obtained by Mr. Diller. He gave a short account of previous literature, and mentioned some of the main points in which our knowledge of the Troad is now advanced. Mr. Topley briefly described the physical geography and general structure of the country, illustrating this by means of a section which he had prepared from Mr. Diller's map and paper.

Zoological Society, June 19.—Prof. Flower, F.R.S., president, in the chair.—The Secretary read an extract from a letter received from Mr. Albert A. C. Le Souëf, containing observations on the colouration of the plumage of the Satin Bower-bird (*Ptilonorhynchus holosericeus*).—Prof. E. Ray Lankester, F.R.S., read a memoir on the muscular and endoskeletal systems of *Limulus* and *Scorpio*, drawn up by himself with the assistance of his two pupils, Mr. W. J. Barham and Miss E. M. Beck. These investigations seemed to confirm Prof. Lankester's previously expressed views as to the near affinity of these two forms, hitherto usually referred to different classes of the animal kingdom, and to justify the association of *Limulus* with the Arachnida.—A paper was read by Dr. Gwyn Jeffreys, F.R.S., F.Z.S., on the Mollusca procured during the cruise of H.M.S. *Triton* between the Hebrides and Faroes in 1882. Ten new species of Gastropoda were described, and another species (*Fusus sabini*) was fully diagnosed. The chief interest of the paper consisted in the distinction of the Mollusca inhabiting the "warm" and "cold" areas of that sea-bed, in accordance with the views of Dr. Carpenter and the late Sir Wyville Thomson.—A communication was read from Mr. Martin Jacobi, containing descriptions of some new species of Beetles belonging to the family Galerucidae.—Prof. P. Martin Duncan, F.R.S., read a paper on the Madreporarian genus *Phymastrea* of Milne-Edwards and Jules Haime, and gave the description of a new species obtained on the west coast of India, which he proposed to call *Phymastrea irregularis*.—Dr. J. S. Garson, F.Z.S., read a paper on the anatomy of the Pygmy Hog of Nepal (*Porcula salvania* of Hodgson), as exhibited in a female specimen of this animal which had lately died in the Society's Gardens. Dr. Garson came to the conclusion that this animal was not sufficiently different from the true Pigs (*Sus*) to warrant its generic separation.—A communication was read from Mr. Osbert Salvin, F.R.S., containing an account of a series of birds collected by Capt. A. H. Markham, R.N., at various points of the western shores of the Pacific, from Esquimault on the north, to the Straits of Magellan on the south, including some from the Galapagos Islands and from the island of Juan Fernandez.—Mr. E. W. White, F.Z.S., read some notes on the birds of the Argentine Republic, being a supplement to two former papers read before the Society on the same subject.—A communication was read from Mr. A. Boucard, C.M.Z.S., containing an account of a collection of birds made in Yucatan by Mr. Gummer.

SYDNEY

Royal Society of New South Wales, May 2.—Annual meeting.—The number of new members elected during the year was forty-one, making the total number of ordinary members upon the roll to date 486. At the Council meeting held on December 13 it was unanimously resolved to award the Clarke Memorial Medal for the year 1883 to Baron Ferdinand von Müller, K.C.M.G., F.R.S., Government Botanist, Melbourne; and at the same meeting the Council awarded the prize of 25*l.*, which had been offered for the best communication on the "Influence of Australian Climates and Pastures upon the Growth of Wool," to Dr. Ross, M.L.A., Molong; and the prize for the one upon "The Aborigines of New South Wales" to Mr. John Fraser, B.A., West Maitland. During the year the Society held ten meetings, at which the following papers were read:—Annual address by H. C. Russell, F.R.A.S.—On the geology of the Hawkesbury sandstone, by Rev. J. E. Tenison-Woods, F.G.S.—On tropical rains, by H. C. Russell, F.R.A.S.—On the orbit of the late

comet, by G. Butterfield.—On a method of determining the true south, by J. S. Chard.—Notes on the progress of New South Wales during the years 1872 to 1881, by Christopher Rolleston, C.M.G.—On some marine fossils of the coal-formation of New South Wales, by Rev. J. E. Tenison-Woods, F.G.S., F.L.S.—On some Mesozoic fossils from the Palmer River, Queensland, by Rev. J. E. Tenison-Woods, F.G.S., F.L.S.—On French geographical societies and the colonies, by E. M. de la Meslee.—Notes on the aborigines of New Holland, by James Manning.—On the ashes of some Epiphytic ferns, by W. A. Dixon, F.C.S.—On a fossil plant formation in Central Queensland, by Rev. J. E. Tenison-Woods, F.G.S., F.L.S.—The Medical and Microscopical Sections held regular monthly meetings. The sum expended upon the library during the year was 422*l.* 12*s.* 10*d.* At the annual meeting M. Louis Pasteur, M.D., was unanimously elected an Honorary Member of the Society, to fill the vacancy caused by the death of the late Dr. Charles Darwin, M.A., F.R.S., and Dr. Ottokar Feistmantel of Calcutta was elected a Corresponding Member.—Names of the new Council:—President, Hon. J. Smith, C.M.G. Vice-Presidents: Charles Moore, F.L.S., W. A. Dixon, F.C.S. Hon. Treasurer, H. G. A. Wright, M.R.C.S.E. Hon. Secretaries: Prof. Liversidge, F.R.S., F.G.S., Dr. Leibius, F.C.S. Members of Council: Robert Hunt, F.G.S., Dr. W. Morris, P. R. Pedley, Frederick Poolman, Chr. Rolleston, C.M.G., H. C. Russell, F.R.A.S.

PARIS

Academy of Sciences, July 2.—M. Blanchard, president, in the chair.—Obituary notices of M. Maillard de la Gournerie, by M. Bertrand; of Mr. William Spottiswoode, by M. Dumas; and of General Sabine, by M. d'Abbadie.—On the condensation and liquefaction of gases, by M. J. Jamin.—On the tornadoes that swept over Kansas, United States, on May 30, 1879, by M. Faye. Although every tornado almost invariably takes place in the south-west quadrant of an area of comparatively low pressure (Finlay's "Report of 600 Tornadoes"), this meteorological condition is not to be regarded as their true cause. The author shows on the contrary that, like other storms and hurricanes, they are due to whirlwinds descending with vertical axis, and originating, not in the lower atmospheric strata, but in the upper currents whose direction is entirely independent of the light winds previously prevailing near the surface of the earth.—Remarks and observations on MM. Carl Vogt and Emile Yung's treatise on practical comparative anatomy, by M. de Quatrefages. For Darwin's biological tree representing all life past, present, and even future on the globe, Vogt and Yung substitute a grove composed of many distinct trees, the number and species of which still remain to be determined. But while this conception deprives the Darwinian theory of much of its seductive grandeur, evolution itself can lose nothing by abandoning an absolute system in which mere hypothesis plays far too large a part.—On a complete system of the combinations of two biquadratic binary forms, by M. C. Stephanos.—On a class of lineal equations of the fourth order, by M. E. Goursat.—On surfaces of the third order, by M. C. Le Page. A method is proposed of constructing a surface of the third order determined by nineteen points.—On the application of Ampère's method to the determination of the elementary law of electrical induction by displacement, by M. Quet.—Electrodynamic actions involving arbitrary functions; hypotheses determining these functions, by M. P. Le Cordier.—Method of unmagnetising timepieces which have become magnetised by the vicinity of a powerful magnetic field, by M. Deprez.—Action of chlorhydric acid on the protosulphuret of tin, by M. A. Ditté.—On the fusibility of salts, by M. E. Maumené.—On a new process of making a quantitative analysis of urea, by M. L. Hungouenq.—An examination of the corpuscles held in suspension in water, by M. Eug. Marchand.—Deposits of barytine, celestine, and anhydrite, their association and probable mode of formation, by M. Dieulafoy.—The experiences of M. Gorgeu are shown to be inadequate to explain the formation of these substances in lodes and in saline lands. At the same time they are not to be absolutely rejected, and may prove to be of great value when the chemical aspect of volcanic phenomena is taken seriously in hand.—Influence exercised by the elements contained in sea water on the development of fresh-water animals, by M. H. de Varigny. From experiments made with the spawn of frogs and other organisms, it appears that chloride of sodium (kitchen salt) is the substance most noxious to the development of fresh-water animals.—Application of heat to the preservation of wines in common use, the blends known as "vins de coupage,"

by M. E. Houdart. By this process all danger of fermentation is avoided, while the quality and appearance of the wines so treated remain unimpaired.

BERLIN

Physiological Society, June 15.—In continuation of the experiments upon the influence of temperature upon the time occupied by reflex actions, which Prof. Kronecker described at the last meeting, Prof. Ewald communicated observations which he had made upon patients who were suffering from rabies. These patients responded with a reflex jerk quicker in a temperature between 0° C. and 5° C. than in temperatures between 40°—50°, and at higher temperatures the times occupied by a reflex action again became shorter.—Dr. B. Baginsky spoke about the results of experiments which he had instituted in order to determine the function of the cochlea. It is well known that anatomical research has determined that the membrana basilaris of the cochlea, in which the terminal filaments of the auditory nerve are distributed, increases in breadth from the bottom towards the upper part; and Herr von Helmholtz had founded an hypothesis upon this to explain the differentiating perception of certain higher tones, viz. that the sound-waves that penetrate into the cochlea occasion a synchronous vibration either in the broader upper half or in the narrower lower half of the membrana basilaris, so that the higher tones would excite the fibres of the auditory nerve distributed in the lower part, and the deeper notes the fibres distributed in the upper part. In animals which are low in the scale of development there is a similar arrangement, which consists of auditory cilia of different lengths, which have the same function, as the shorter ones are intended for the higher notes, and the longer ones for the deeper notes and noises, and are set into synchronous vibration by them. This hypothesis has been experimentally confirmed in the case of the auditory cilia of the lower animals, and it had actually turned out true that deep notes produced vibrations in the long hairs, and high notes in the short ones. Herr Baginsky now undertook to test the hypothesis of Herr von Helmholtz experimentally on the cochlea of higher animals. After he had succeeded in overcoming the great practical difficulties, he wounded the top of the cochlea of the healthy ear in dogs which had been made absolutely deaf of their other ear, and then observed their hearing powers by means of the different notes of organ-pipes between c and c''' . On the third day after the immediate consequences of the operative interference had disappeared, it was found that the dogs responded perfectly to the notes c''' , c'' , c' , c , but were deaf to the deeper notes. This condition remained unaltered for weeks, and when the animal that had been the subject of experiment was killed, the post-mortem examination showed that the top only of the cochlea had been wounded, and that the filaments of the auditory nerve that were distributed to that portion were destroyed. Less precise were the results of the experiments in which the lower part of the cochlea was destroyed; in these cases absolute deafness occurred in a succession of cases; in other cases, again, the dogs responded to high as well as to low notes, to the latter, perhaps, a little better; and again, in other cases, on the other hand, the dogs only responded to the notes c , c' , c'' , while they were deaf to the higher notes. But this condition only lasted some fourteen days; then hearing power for the higher notes set in again, and soon reached the same sensitiveness as that for the deep notes. Post-mortem examination showed in these various cases different degrees of distinction occasioned by the operation. Herr Baginsky believes that he has by his experiments, in particular by the results of lesion of the top of the cochlea, verified experimentally for the mammalian cochlea the hypothesis of von Helmholtz.—Dr. B. Fränkel spoke concerning the different views of authors as to the behaviour of the pharyngo-nasal isthmus during the phonation of vowels, and about the attempts which have been made, up to the present inconclusive, to prove the closure or the patency of the isthmus. He himself has become convinced by his observations that in the phonation of all vowels the communication between the pharynx and nasal cavity remains patent, although more or less narrowed, and he demonstrated this partly by means of a spirit-manometer, one of whose limbs was brought into connection with one nostril, at the same time closing the other nostril while he was sounding the letter, or by means of a flame towards which he directed an elastic tube which was in connection with both nostrils. Not only on pronouncing A, but also with E, O, I, and U, a current of air was seen to issue from the nose. Dr. Fränkel then discussed the various varieties of nasal speech, of which he distinguishes three

anatomical varieties, and finally gave his view as to the function of the uvula, which occurs only in man and in some of the higher apes, viz. that it has got nothing to do with the shutting off the isthmus nasopharyngeus or any connection at all with speech; it serves rather to protect the larynx in swallowing by dividing mouthfuls of solid food and drink into two portions, and thus compelling them to slip down on either side of the larynx; it likewise forms an elongation of the epiglottis.—Prof. Kronecker gave a short exposition of a demonstration which Dr. Openschewsky gave to the Society. In experimenting on the influence of the vagus and upon the gastric movements, it was observed that when the peripheral end of the gastric branch of the vagus is stimulated by single currents, the contraction of the cardia does not occur until after the cessation of the stimulations, although during the continuance of these no contraction of the stomach is observed, when a certain frequency of repetition of the stimuli has been attained. This induced Dr. Openschewsky to examine more closely the inhibitory action of the vagus. It has now been known for a good many years that in high degrees of anemia the cardia executes spontaneous rhythmical contractions; by ligature of the coronary artery this anæmia could be artificially produced, and the rhythmical contractions could be produced in the cardia. If the peripheral ends of the gastric branches of the vagus were now stimulated, an inhibition of these movements of the cardia regularly occurred, which lasted as long as the stimulation of the vagus. It is thus proved that the gastric branches of the vagus contain inhibitory as well as excitant fibres, exactly as its cardiac branches; and Dr. Openschewsky proposes to work out this part of the physiology of the vagus still further.

VIENNA

Imperial Academy of Sciences, April 12.—M. Abeles, on secretion from the living kidney if floated through with blood.—E. Hussak, on cordierite in volcanic outcasts.—E. Zuckerkandl, on the communications between the arteries of the human lung.—J. Wroblewski and K. Olszewski, on the liquefaction of oxygen and solidification of carbon disulphide and alcohol.—G. Goldschmidt, on pyrene-quinone.—T. von Oppolzer, tables to determine eclipses of the moon.—J. Liznar, a note on the theory of Lamart's variation apparatus for horizontal intensity.

CONTENTS

PAGE

Hydraulic Manual. By Major Allan Cunningham, R.E.	241
Origines Celticae. By Rev. A. H. Sayce	242
Our Book Shelf:—	
Martin and Moale's "Handbook of Vertebrate Dissection"	242
"An Easy Introduction to Chemistry"	243
Holmes's "Practical Electric Lighting"	243
Letters to the Editor:—	
Geology of the Congo.—S. R. Pattison	243
Intelligence in Animals.—G. Bidie	244
The Mealy Odorous Spot in Lepidoptera.—Dr. H. A. Hagen	244
Causes of Glacier Motion.—Dr. John Rae, F.R.S. (With Diagram)	244
Sand.—James Melvin	245
Garfish—Wild Fowl.—Robert S. Goodsir	245
Glowworms.—W. J. Stillman	245
Mimicry.—A. Hale	245
Indian Numeration.—Frederic Drew	245
Funeral of Mr. Spottiswoode	246
The Eclipse Party	247
The Archaeology of Southern California. By L. P. Gratacap	249
The Size of Atoms, II. By Sir William Thomson, F.R.S. (With Diagrams)	250
Stellar Photography at Harvard	255
Notes	256
Our Astronomical Column:—	
The Constant of Aberration	259
On the Function of the Sound-Post, and on the Proportional Thickness of the Strings of the Violin. By Dr. William Huggins, F.R.S. (With Diagrams)	259
University and Educational Intelligence	261
Scientific Serials	261
Societies and Academies	262